Nanoparticles (NPs), such as liposomes and albumin, currently employed in clinical practice, aim to improve the solubility and efficacy while decreasing the adverse side effects. The enhanced permeability and retention (EPR) effect is becoming the gold standard for the development of nanomedicine.

SUMMARY

[0005a] In one aspect, the present invention refers to use of a therapeutically effective amount of an anti-cancer agent encapsulated in nanoparticles in the manufacture of a medicament for treating cancer in a subject intraperitoneally, wherein nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution wherein the nanoparticles comprise a hydrogenated naturally-occurring phospholipid, cholesterol and d-alpha-tocopheryl polyethylene glycol succinate. In another aspect, the present invention refers to use of a therapeutically effective amount of an anti-cancer agent encapsulated in sustained release nanoparticles in the manufacture of a medicament for treating cancer via regional delivery in a subject wherein the anti-cancer agent nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution and are administered intrapleurally, wherein the sustained release nanoparticles comprise a hydrogenated naturally-occurring phospholipid, cholesterol and d-alpha-tocopheryl polyethylene glycol succinate. In one example, there is disclosed use of a therapeutically effective amount of an anti-cancer agent encapsulated in nanoparticles in the manufacture of a medicament for treating cancer in a subject intraperitoneally, wherein nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution.

[0005b] In another example, there is disclosed use of a therapeutically effective amount of an anti-cancer agent encapsulated in sustained release nanoparticles in the manufacture of a medicament for treating cancer via regional delivery in a subject wherein the anti-cancer agent nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution and are administered intrapleurally.

[0006] In yet another example, there are disclosed methods for treating cancer intraperitoneally in a subject comprising administering to said subject in need thereof an anti-cancer agent encapsulated in nanoparticles wherein nanoparticles are characterized to slowly release anti-cancer agent in a timely fashion that allows efficient killing of tumor cells.

[0007] In a further example, there are disclosed methods for treating cancer via regional delivery in a subject comprising administering to said subject in need thereof an anti-cancer agent encapsulated in sustained release nanoparticles wherein the anti-cancer agent nanoparticles are administered intrapleurally.

INCORPORATION BY REFERENCE

[0008] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

WHAT IS CLAIMED IS:

1. Use of a therapeutically effective amount of an anti-cancer agent encapsulated in nanoparticles in the manufacture of a medicament for treating cancer in a subject intraperitoneally, wherein nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution wherein the nanoparticles comprise a hydrogenated naturally-occurring phospholipid, cholesterol and d-alpha-tocopheryl polyethylene glycol succinate.

2. The use of claim 1, wherein the hydrogenated naturally-occurring phospholipid is hydrogenated soy phosphatidyl choline (HSPC).

3. The use of claim 1 wherein said anti-cancer agent is selected from the group consisting of gemcitabine, idarubicin/cytarabine, etopside phosphate, gleevac, temozolomide, bortezomib, letrozole, cetuximab, bevacizumab, paclitaxel, nab-paclitaxel, docetaxel, erlotinib, pemetrexed, pemetrexed/carboplatin, paxlitaxel/carboplatin, letrozole/cyclophsphamide, temsirolimus,, bevacizumab/temsirolimus, lpilimumab, RAD001, Pazopanib, FOLFIRI, BKM120, GSK1120212, PF-05212384/irinotecan, AZD2171, PF-04691502, cyclophosphamide, cisplatin, cytarabine/daunorubcin, tersirolimus, erlotinib/temsirolimus, capecitabine, tamoxifen, bortezomib, trastuzumab, docetaxel/capecitabine, trastuzumab/tipifarnib, tipifarnib/gemcitabline, tootecan, and combinations thereof.

4. The use of claim 3, wherein said anti-cancer agent is paclitaxel.

5. The use of claim 1 wherein said cancer is ovarian cancer, lung cancer, liver cancer, gastric cancer, or colon cancer.

6. The use of claim 5, wherein said cancer is ovarian or colon cancer.

7. Use of a therapeutically effective amount of an anti-cancer agent encapsulated in sustained release nanoparticles in the manufacture of a medicament for treating cancer via regional delivery in a subject wherein the anti-cancer agent nanoparticles are characterized to slowly release anti-cancer agent at a rate of 30% or less per 24 hours based on in vitro drug dissolution and are administered intrapleurally, wherein the sustained release nanoparticles comprise a hydrogenated naturally-occurring phospholipid, cholesterol and d-alpha-tocopheryl polyethylene glycol succinate.

8. The use of claim 7, wherein the hydrogenated naturally-occurring phospholipid is hydrogenated soy phosphatidyl choline (HSPC).

9. The use of claim 7, wherein the cancer is ovarian cancer, lung cancer, liver cancer, gastric cancer, or colon cancer.

10. The use of claim 7, wherein the cancer is metastasis.

11. The use of claim 7, wherein said subject has severe adhesion in the peritoneal cavity.

12. The use of claim 7 wherein said anti-cancer agent is selected from the group consisting of gemcitabine, idarubicin/cytarabine, etopside phosphate, gleevac, temozolomide, bortezomib, letrozole, cetuximab, bevacizumab, paclitaxel, nab-paclitaxel, docetaxel, erlotinib, pemetrexed, pemetrexed/carboplatin, paxlitaxel/carboplatin, letrozole/cyclophsphamide, temsirolimus,, bevacizumab/temsirolimus, lpilimumab, RAD001, Pazopanib, FOLFIRI, BKM120, GSK1120212, PF-05212384/irinotecan, AZD2171, PF-04691502, cyclophosphamide, cisplatin, cytarabine/daunorubcin, tersirolimus, erlotinib/temsirolimus, capecitabine, tamoxifen, bortezomib, trastuzumab, docetaxel/capecitabine, trastuzumab/tipifarnib, tipifarnib/gemcitabline, tootecan, and combinations thereof.

13. The use of claim 12, wherein said anti-cancer agent is paclitaxel.